

REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

Before addressing the specific grounds of rejection raised in the present Office Action, applicants have amended Claim 1 to recite that the composition used in the claimed method "consists essentially of" liquid or supercritical CO₂ and a fluoride-generating species. Additionally, applicants have amended Claim 15 to recite that the composition which consists essentially of liquid or supercritical CO₂ and a fluoride-generating species "further consists of" a component selected from the group consisting of a surfactant, a co-solvent and mixtures thereof. Applicants submit that the co-solvents are defined in the specification to include inert hydrocarbons. See, Page 7, lines 25-26.

Applicants submit that the above amendments to the claims do not introduce new matter into the specification. Rather, the amendment to Claim 1 restricts the claimed composition to one including liquid or supercritical CO₂, a fluoride-generating species as well as other materials that do not materially effect the composition. Support for this amendment to Claim 1 is found at Page 5, lines 24-27 and Page 7, lines 12-16. The other materials that can be present which do not materially effect the composition are recited in amended Claim 15. See Page 7, lines 22-26.

In the present Office Action, Claims 1, 2, 15 and 16 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent No. 6,500,605 to Mullee, et al. ("Mullee, et al."). Claims 3-14 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable over the combined disclosures of Mullee, et al. and Roger R. Alm "Formulation Techniques using Triflic Acid Salts", Modern Coatings, Oct. 1990 ("Alm"). Claims 17-20 stand rejected under 35 U.S.C. § 103 as allegedly unpatentable

over the combined disclosures of Mullee, et al. and U.S. Patent No. 6,316,057 to Hirayama, et al. ("Hirayama, et al.").

Concerning the § 102(e) rejection, it is axiomatic that anticipation under §102 requires that the prior art reference disclose each and every element of the claim to which it is applied. In re King, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants submit that the method recited in the claims of the present application is not anticipated by the disclosure of Mullee since the applied reference does not disclose the use of applicants' claimed composition which consists essentially of liquid or supercritical CO₂ and a fluoride-generating species. The term "fluoride-generating species" is defined in the instant application to include any species that generates fluoride ions. See Page 5, line 24-Page 6, line 2. The types of species that can be used in generating fluoride ions are described at Page 6, line 14-Page 7, line 10. Applicants observe that the recited fluoride sources are anhydrous including anhydrous HF and organic bearing fluoride compounds. Applicants respectfully submit that no water is used in the inventive method.

Mullee, et al. provide a method of removing photoresist and residue from a substrate which starts by maintaining supercritical carbon dioxide, an amine, and a solvent in contact with the substrate so that the amine and the solvent at least partially

dissolve the photoresist and the residue. Next, the photoresist and the residue are removed from the vicinity of the substrate. In an alternative embodiment, the amine and the solvent are replaced with an aqueous fluoride. In contrast to the claimed method, Mullee, et al. disclose a composition for removing a photoresist and residue from a substrate that includes supercritical CO₂ and an aqueous fluoride. This composition is different from the claimed invention since no water is present therein.

Applicants observe that the transitional phrase "consists essentially of" excludes the presence of water since the prior art process disclosed in Mullee, et al., contributes substantial hazardous waste (aqueous HF or NH₄F) which cannot be burned directly as waste. In the claimed invention, an organic waste is produced which can be disposed by combustion.

The foregoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention, as required by King and Kloster Speedsteel; therefore the claims of the present application are not anticipated by the disclosure of Mullee, et al. Applicants respectfully submit that the instant §102 rejection has been obviated and withdrawal thereof is respectfully requested.

With respect to the obviousness rejection citing the combination of Mullee, et al. and Alm, applicants respectfully submit that the aforementioned combination of applied references do not render the claims of the present application obvious. Specifically, the combined disclosures of Mullee, et al. and Alm do not teach or suggest a process of cleaning a precision surface comprising contacting a reactive ion etched precision surface having vias, cavities, trenches or channels incorporated therein, said reactive ion etched precision surface containing reactive ion etch residue, with a composition which consists

essentially of liquid or supercritical carbon dioxide and a fluoride-generating species until the reactive ion etch residue is removed from the precision surface.

Mullee, et al. are defective for the reasons mentioned above. Thus, the above arguments made under the anticipation rejection, which are incorporated herein by reference, are applicable here for this obviousness rejection. To reiterate: Mullee, et al. disclose the use of water within their disclosed composition (supercritical CO₂ and anhydrous fluoride), while applicants' claimed composition does not include water (consists essentially of liquid or supercritical CO₂ and a fluoride-generating species).

Alm does not alleviate the above defects in Mullee, et al. for at the following reasons: First, applicants submit that Alm, which is directed to acid catalysts derived from triflic acid that can be used in the polymerization of cationically thermosetting resins, is nonanalogous art. In order for a reference to be deemed analogous, it must (1) be from the field of applicants' endeavor, or (2) it must be reasonably pertinent to the particular problem with which the applicants are concerned. See, for example, *In Re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ 1443, 1445 (Fed. Cir. 1992), *In Re Deminski*, 796 F. 2D 436, 230 USPQ 313 (Fed. Cir. 19986) and *In Re Clay*, 9666 F.2d 656, 659, 23 USPQ 2d 1058, 1060-61 (Fed. Cir. 1992).

Applicants submit that Alm is not in applicants' field of endeavor which is directed to the removal of reactive ion etched residue from a precision surface. Instead, Alm is directed to catalysts that are used in polymerization, condensation, ring-opening and other like reactions. Moreover, applicants submit that Alm is not reasonably pertinent to the problem being solved since it is directed to catalysts for use in various reactions, such as in the polymerization of thermosetting resins, while the present invention solves the problem of removing reactive ion etched residue from a precision

surface. Applicants observe that the Examiner has indicated that Alm is directed to a method of cleaning. Applicants disagree. The use of triflic acid as a catalyst in a reaction such as polymerization, ring opening, condensation, copolymerization, etc. has nothing to do with cleaning, let alone removing etched residue from a precision etched surface.

Even assuming pro-arguendo that Alm would be considered analogous art, the applied secondary reference does not teach or suggest a composition that consisting essentially of liquid or supercritical CO₂ and a fluoride-generating species for the removal of etched residue from a precise surface.

As such, the combined disclosures of Mullee, et al. and Alm do not render Claims 3-14, which ultimately depend on Claim 1, of the present application obvious.

With respect to the obviousness rejection citing the combined disclosures of Mullee, et al. and Hirayama, et al., applicants respectfully submit that the aforementioned combination of applied references does not render the claimed method obvious.

Specifically, the combined disclosures of Mullee, et al. and Hirayama, et al. do not teach or suggest a process of cleaning a precision surface comprising contacting a reactive ion etched precision surface having vias, cavities, trenches or channels incorporated therein, said reactive ion etched precision surface containing reactive ion etch residue, with a composition which consists essentially of liquid or supercritical carbon dioxide and a fluoride-generating species until the reactive ion etch residue is removed from the precision surface.

Mullee, et al. are defective for the reasons mentioned above. Thus, the above arguments made under the anticipation rejection, which are incorporated herein by reference, are applicable here for this obviousness rejection. To reiterate: Mullee, et al. disclose the use of water within their disclosed composition (supercritical CO₂ and

anhydrous fluoride), while applicants' claimed composition does not include water (consists essentially of liquid or supercritical CO₂ and a fluoride-generating species). Hirayama, et al. do not alleviate the deficiencies in Mullee, et al. since the applied reference does not teach or suggest applicants' claimed method of cleaning a precision surface comprising contacting a reactive ion etched precision surface having vias, cavities, trenches or channels incorporated therein, said reactive ion etched precision surface containing reactive ion etch residue, with a composition which *consists essentially of* liquid or supercritical carbon dioxide and a fluoride-generating species until the reactive ion etch residue is removed from the precision surface.

Instead, Hirayama, et al. disclose a process for coating a surface of a semiconductor device which comprises the steps of applying a reagent comprising a reactive group selected from Si-H, Sn-H and Ge-H, in the presence of a platinum metal onto a surface that is to be coated. Applicants respectfully submit that Hirayama, et al. do not teach or suggest that the reagent disclosed therein can be used in conjunction with liquid or supercritical fluid carbon dioxide to remove reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein. Moreover, Hirayama, et al. do not disclose a composition that consists essentially of liquid or supercritical CO₂ and a fluoride-generating species for removing reactive ion etch residue from an etched precision surface.

In view of the above comments, the combined disclosures of Mullee, et al. and Hirayama, et al. do not render applicants' claimed method obvious.

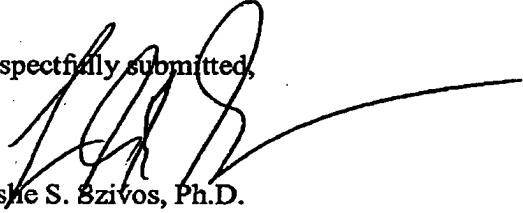
The various §103 rejections also fail because there is no motivation in the applied references which suggest modifying the disclosed methods to include the use of a composition that consists essentially of liquid or supercritical CO₂ and a fluoride-

generating species for the removal of reactive ion etch residue from an etched precision surface. Mullee, et al. require the presence of water and none of the other references provide any motivation to remove water from the disclosed process of Mullee, et al. Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaack, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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